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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/537,942	06/22/2006	Seamus Curran	047182-0139	1393

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EXAMINER	
MILLER, DANIEL H	

ART UNIT	PAPER NUMBER
1794	

MAIL DATE	DELIVERY MODE
10/29/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/537,942	CURRAN ET AL.	
	Examiner	Art Unit	
	DANIEL MILLER	1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 March 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-38* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-38* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *3/5/2007 and 6/9/2005*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-3, 7-33, 36-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Halas et al (US 6,778,316) in view of Azamian (direct observation of covalent coupling of quantum dots to single walled carbon nanotubes).

3. Halas teaches a sensor comprising: an optical device; and a thin film supported by said device, said thin film comprising a matrix; a plurality of Plasmon resonant particles (chromophores) embedded in said matrix; and a plurality of carbon nanotubes embedded in said matrix (see claim 4 ref.).

4. *The sensor of Halas can* comprise a light directing surface comprising a surface of a waveguide (as required by applicant's claim 38); and an optical enhancing member comprising: a matrix; and a plurality of resonant nanoparticles embedded in said matrix, wherein said optical enhancing member is disposed so as to modify the optical response of the optical sampling member (see claim 7 ref.).

5. Halas does not teach providing chromophores attached to defect sites.

6. Azamian teaches covalent bonding of single walled nanotubes to metal nanoparticles through defect sites (see first paragraph column 1).

7. It would have been obvious to one of ordinary skill in the art at the time of the invention to provide covalent bonding of single walled nanotubes to metal nanoparticles through defect sites, as taught by Azamian, in the optical device of Halas in order to enhance electrical and optical properties by development of low resistance Ohmic contacts advantageous for nanoelectronic applications (see first column and figures of Azamian).

8. *Regarding claims 2-3 and 31-33, the gold chromophores are connected to an organic molecule and are considered to meet the definition of a nanoparticles, colloids, or nanocluster. Specifically regarding claim 3, the chromophores are considered to be chemisorbed by the organic attachment to the nanotube (see figures). No patentable distinction is seen.*

9. Regarding claims 7 and 27, Azamian teaches the functional group of the defect site is a carboxylic acid (see first column) which covalently bonds to a chromophore.

10. Regarding claim 9, the matrix can be a polymer matrix (see Halas).

11. Regarding claims 10-12, the nanoparticles may be mixed into the fluid precursor prior to deposition (column 6 lines 1-5). Metal nanoshells (chromophores) can be mixed in Halas into various polymers including PVA, polyvinylpropylene (PVP), polymethylmethacrylate (PMMA), and polydimethylsiloxane (PDMS) (see column 6 lines 1-20). Therefore a wide variety of polymers would have been obvious to provide with anticipated success by one of ordinary skill. Regarding claim 12, the nanotubes are formed on a substrate which would be expected to determine the stiffness of the material as claimed. No patentable distinction is seen.

12. Regarding claim 13, the nanotubes can be aligned (see Halas).

13. Regarding claim 14, to the extent to which applicant has defined the terms “SuperNanoMolecular" and “non-centrosymmetric” the combined teachings are considered to read on applicant's claimed invention. No patentable distinction is seen.

14. Regarding claims 15 and 16, the morphology can be controlled by the amount of constituent materials used and the covalently bound (see figures Azamian) chromophores binding can be controlled to a predetermined number of defect sites by varying the oxidation procedure controlling tube wall fictionalization (see last column second page Azamian).

15. As stated above, regarding claims 17-18 and 37, the material is considered a non-linear optical material that forms a device, specifically a waveguide (see claim of Halas above), as claimed. No patentable distinction is seen

16. Regarding claims 19-21 and 36, regarding applicant’s claim to films exhibiting X effects it would have been obvious to one of ordinary skill in the art at the time of the invention to provide a variety of optical properties consistent with the intended use of the device by modifying the level of fictionalization and concentration of materials in the matrix. No patentable distinction is seen.

17. The limitations of claim 22 are addressed above.

18. Regarding claims 3 and 23-24, the metal nanoparticle (chromophores) are considered to be “chemisorbed” to the defect site as claimed (see Azamian generally and figures).

19. Regarding claims 8 and 25-28, applicant's has claimed acid functionalized and anionic initiators comprising alkyllithium salts it would have been obvious to one of ordinary skill in the art at the time of the invention to provide a wide variety of functionalized consistent with basic organic chemistry functionalized techniques known to one of ordinary skill in the art. No patentable distinction is seen.

20. Regarding claim 29 and 30, the matrix can be a polymer matrix and the polymer matrix is considered flexible (see Halas).

21. Regarding claim 38, as discussed above, the material is incorporated into a waveguide (claim 7 Halas).

22. Claims 4-6 and 34-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Halas et al (US 6,778,316) in view of Azamian (direct observation of covalent coupling of quantum dots to single walled carbon nanotubes) further in view of Neuschafer et al (US 6,078,705).

23. Halas et al (US 6,778,316) in view of Azamian (direct observation of covalent coupling of quantum dots to single walled carbon nanotubes), discussed above do not appear to teach an organic dye.

24. Neuschafer et al (US 6,078,705) teaches an optical waveguide which may use luminescent compounds functionalized luminescent dyes having a luminescence of a wavelength in the range of from 330 nm to 1000 nm, such as polypyridyl/ **Phenazine**/ ruthenium complexes, platinum/porphyrin complexes, such as octaethyl-platinum-

porphyrin, long-lived europium and terbium complexes or cyanine dyes (see column 17 lines 1-16). Especially suitable for analyses in blood or serum are dyes having absorption and emission wavelengths in the range of from 600 to 900 nm (see column 17 lines 15-20).

25. It would have been obvious to one of ordinary skill in the art at the time of the invention to use a **Phenazine** dye, as disclosed by Neuschafer, including the claimed PSF (phenosafranin) phenazine dye, in order to enhance waveguide properties especially wherein the waveguide is employed for analyses in blood or serum are dyes where having absorption and emission wavelengths in the range of from 600 to 900 nm (see column 17 lines 15-20), are especially suitable. No patentable distinction is seen.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DANIEL MILLER whose telephone number is (571)272-1534. The examiner can normally be reached on M-Th.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Sample can be reached on (571)272-1376. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/David R. Sample/
Supervisory Patent Examiner, Art Unit 1794

/Daniel Miller/
Examiner, Art Unit 1794